

CLAIMS

WHAT IS CLAIMED IS:

1. A remote sensing device that comprises:
 - a programmable logic device that receives a configuration signal; and
 - a switch configurable to pass a communication signal to the programmable logic device as a configuration signal,wherein the switch is configured to automatically block the configuration signal after the programmable logic device has been configured.
2. The device of claim 1, wherein the switch is at least partially controlled by a signal provided by the programmable logic device to indicate when the programmable logic device has been configured.
3. The device of claim 1, further comprising:
 - a second programmable logic device configured to receive a configuration signal; and
 - a second switch configurable to pass the communication signal to the programmable logic device as a configuration signal,wherein the second switch is configured to automatically block the configuration signal after the second programmable logic device has been configured.
4. The device of claim 3, wherein the second switch is further configured to block the configuration signal to the second programmable logic device until after the first programmable logic device has been configured.
5. The device of claim 1, wherein the programmable logic device is a field programmable gate array.
6. The device of claim 1, wherein after the programmable logic device has been configured, the programmable logic device receives the communication signal as a command signal.

7. The device of claim 7, wherein after the programmable logic device has been configured, the programmable logic device transmits responses to the command signal.

8. The device of claim 1, wherein after the programmable logic device has been configured, the programmable logic device communicates with main device using a programmed communications protocol.

9. The device of claim 1, after the programmable logic device has been configured, the programmable logic device fires acoustic transducers and gathers sensor measurements to determine characteristics of a fluid flow.

10. A method of operating a remote device, the method comprising:

providing a path for a communication signal to one or more configuration terminals of a programmable logic device in the remote device; and

automatically opening the path in the remote device after the programmable logic device is configured.

11. The method of claim 10, further comprising: re-establishing the path only if the remote device is powered down or reset.

12. The method of claim 10, further comprising: re-establishing the path upon receiving a predetermined configuration command.

13. The method of claim 10, further comprising: transporting the communication signal via a second path to one or more communication terminals of the programmable logic device.

14. The method of claim 13, wherein the second path is established only after the programmable logic device is configured.

15. The method of claim 10, further comprising:

providing a second path for the communication signal to one or more configuration terminals of a second programmable logic device in the remote device; and automatically opening the second path in the remote device after the second programmable logic device is configured.

16. The method of claim 15, wherein the second path is established only after the first programmable logic device is configured.

17. The method of claim 10, further comprising:
measuring characteristics of a fluid flow; and
communicating measurement data across a boundary of a hazardous environment.

18. A system for performing measurements in a hazardous environment, the system comprising:
a main device isolated from the hazardous environment;
a remote device located within the hazardous environment; and
a communications link that transports at least one communication signal between the main device and the remote device,
wherein the main device uses the communication signal to configure a programmable logic device in the remote device.

19. The system of claim 18, wherein the communications link is a conductor having multiple electrical conductors.

20. The system of claim 18, wherein the remote device further includes a switch that passes the communication signal to a configuration terminal of the programmable logic device before the programmable logic device is configured, and wherein the switch automatically blocks the communication signal from the configuration terminal after the programmable logic device is configured.

21. The system of claim 18, wherein after the programmable logic device is configured, the main device and programmable logic device both employ the communication signal to communicate in accordance with a predetermined communications protocol.

22. The system of claim 18, wherein the main device resets and reconfigures the remote device after detecting incorrect operation of the remote device.

23. The system of claim 18, wherein the remote device is configured to measure one or more characteristics of a fluid flow.